Assignment #1:

To Prove: For every integer \( n > 1 \), \( n < n^2 - 1 \).

Proof: Suppose, by way of contradiction, that there exists an integer \( n > 1 \) such that
\[
 n \geq n^2 - 1 . \quad \ldots
\]

Assignment #2:

To Prove: There exists an integer \( n \) such that \( 5n = 45 \).

Proof: Suppose, by way of contradiction, that for every integer \( n \), \( 5n \neq 45 \). \( \ldots \)

Assignment #3:

To Prove: For all integers \( n \neq 0 \), \(|n| > n\) or \( n > (1/2)n\).

Proof: Suppose, by way of contradiction, that there exists an integer \( n \neq 0 \)
such that \(|n| \leq n\) and \( n \leq (1/2)n \). \( \ldots \)

Assignment #4:

To Prove: For all real numbers \( r \) and \( s \), if \( 0 < r < s \), then \( r^4 < s^4 \).

Proof: Suppose, by way of contradiction, that there exist real numbers \( r \) and \( s \) such that
\[
 0 < r < s \quad \text{and} \quad r^4 \geq s^4 . \quad \ldots
\]

Assignment #5:

To Prove: For all real numbers \( r \) and \( s \), if \( r \) is a rational number and \( s \) is not a rational number, then the sum \( r + s \) is not a rational number.

Proof: Suppose, by way of contradiction, that there exist real numbers \( r \) and \( s \) such that
\[
r \text{ is a rational number and } s \text{ is not a rational number and the sum } r + s \text{ is a rational number.} \quad \ldots
\]